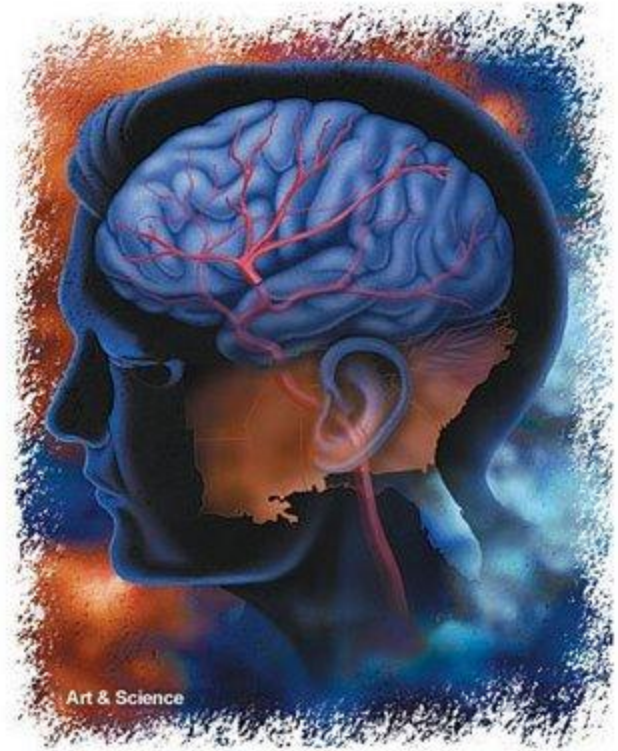
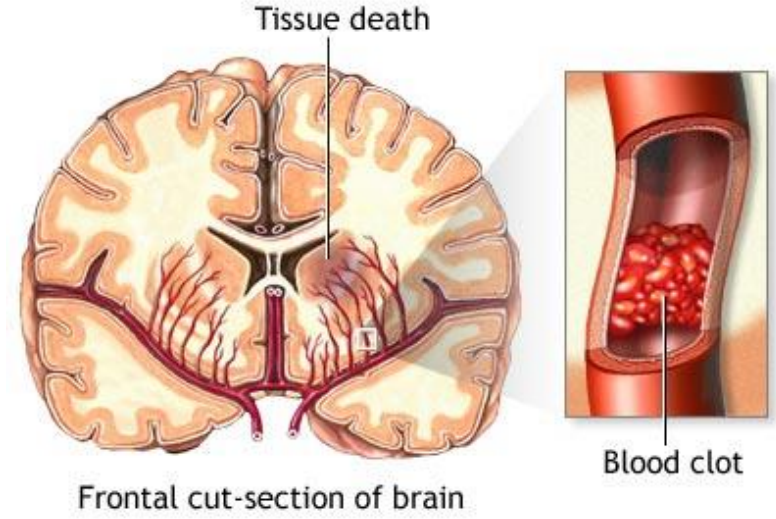
Building Montana's Rural Telestoke Network

- Introduction
- Stroke basics
- Why?
  - rural stroke care?
  - telestroke?
- How?
- Our experience thus far
  - successes
  - barriers
- The future and keys to success
- Questions and discussion



Epidemiology of Stroke

- 5,500,000 stroke survivors are alive today
- 700,000 each year
  - 500,000 of these are first attacks
  - 200,000 are recurrent attacks.
- Every 45 seconds, someone in the US has a stroke
- Every 3 minutes, someone in the US dies from a stroke
- 30% to 50% of stroke survivors do not regain functional independence
- #1 leading cause of adult disabilities
- #2 leading cause of dementia
- #3 leading cause of death
- ~$150,000 cost per case

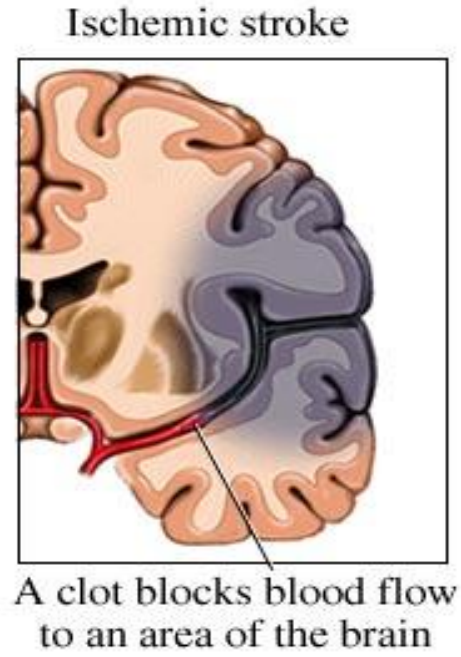


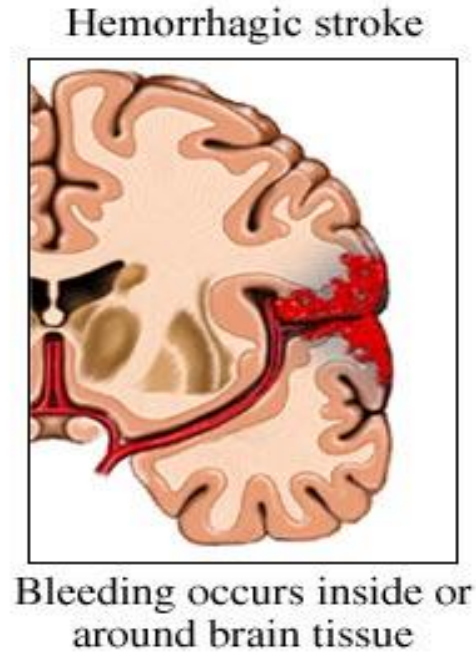
Frontal cut-section of brain

STROKE TYPES

- ISCHEMIC 84%
  - Thrombotic 53%
  - Embolic 31%

- HEMORRHAGIC 16%
  - Intracerebral 10%
  - Subarachnoid 6%

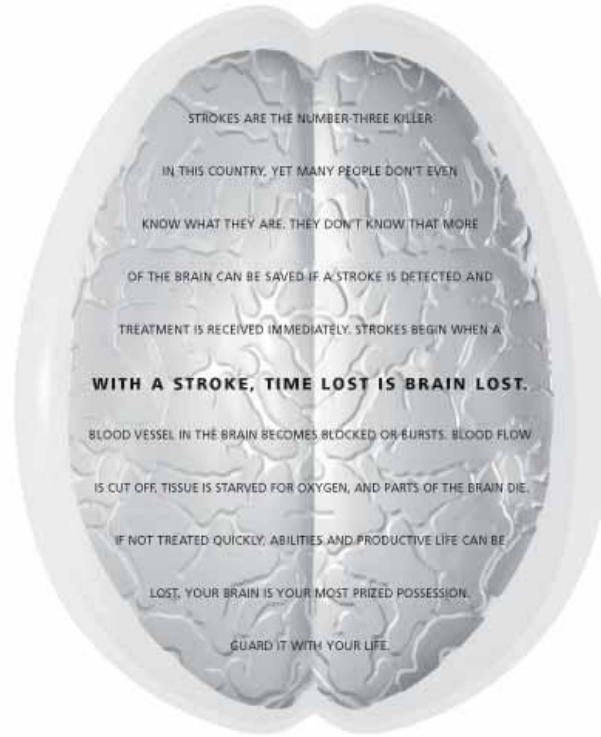




Risk Factors for Stroke

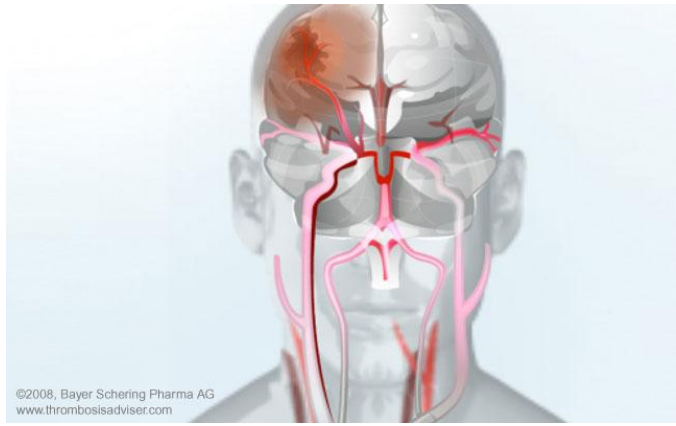
Not Modifiable

- Sex
- Age
- Race/ethnicity
- Low birth weight
- Genetics



Risk Factors for Stroke

- Modifiable- well documented
  - Hypertension
  - Heart Disease [Afib]
  - Carotid artery stenosis
  - Tobacco use
  - Sickle cell disease
  - Postmenopausal hormone therapy
  - Cholesterol level
  - Diabetes
  - Poor diet
  - Physical Activity
  - Obesity
  - Body fat distribution



- Modifiable- Less well documented
  - ETOH abuse
  - Drug abuse
  - BCP
  - Sleep disordered breathing/OSA
  - Migraines
  - Hyperhomocysteinemia
  - Elevated lipoprotein
  - Elevated lipoprotein-associated lipase
  - Hypercoagulability
  - Inflammation
  - Infection

Why Rural Stroke Care Matters?

- Striking disparities urban vs. rural care
- Montana is a uniquely rural environment
- Lack of academic centers to lead the way
- We have evidence that stroke care is better at stroke centers using evidenced-based guidelines

Striking rural-urban disparities observed in acute stroke care capacity and services in the pacific northwest: implications and recommendations.

- Stroke. 2010 Oct;41(10):2278-82. Epub 2010 Sep 2.

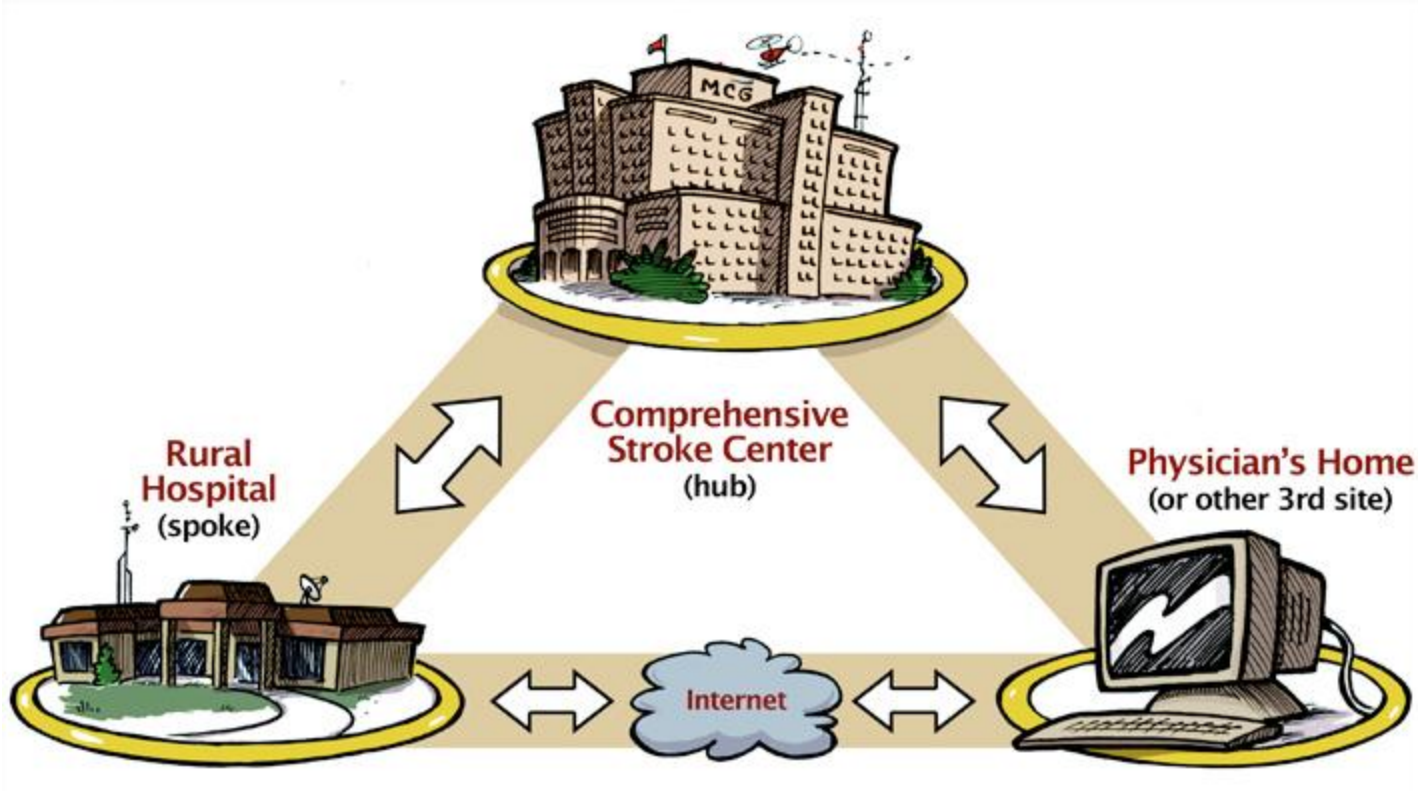
- Shultis W, Graff R, Chamie C, Hart C, Louangketh P, McNamara M, Okon N, Tirschwell D.
- Data Quality and Statistical Services, Center for Health Statistics, Washington State Department of Health, Tumwater, WA 98501-7855, USA.

- **Abstract**
- **BACKGROUND AND PURPOSE: The age-adjusted stroke death rate in adults aged ≥45 years is significantly higher in the Northwest region than in the rest of the United States. Alaska, Idaho, Montana, Oregon, and Washington have substantial rural and frontier areas with unique characteristics and complexities that pose challenges to timely acute stroke care and ultimately affect the patient.**
- **METHODS: A regional needs assessment was conducted to assess acute stroke care capacity and services in the Northwest region. Hospitals with an emergency department were surveyed with a standardized online tool based on the Brain Attack Coalition recommendations and developed by stroke neurologists, emergency medical services leaders, state public health professionals, and American Stroke Association members.**
- **RESULTS: Approximately 76% of hospitals completed the questionnaire. Striking rural-urban differences were seen with rural hospitals having a much lower capacity to adequately care for patients with stroke. Two thirds lacked the necessary personnel, one third lacked necessary neuroimaging equipment, and one fourth were functioning without written emergency department and tissue plasminogen activator stroke protocols.**
- **CONCLUSIONS: This survey represents the first comprehensive regional assessment of stroke care capacity and services both in the Northwest region and the whole United States. The findings have confirmed the need to focus on strengthening stroke personnel, increasing access to care, and promoting written protocols, especially in rural settings. Additionally, promoting stroke center certification, increasing the number of stroke registries throughout the region, encouraging use of inpatient stroke care protocols in rural hospitals, and conducting ongoing stroke care capacity and services surveys is highly recommended.**

Special populations – Native Americans

- Overall higher incidence of stroke than other ethnic groups
- Much higher one-year mortality after first stroke: 35% compared to 22%
- Overall higher incidence of tobacco, DM, and HTN
- 47% with multiple cardiovascular risk factors

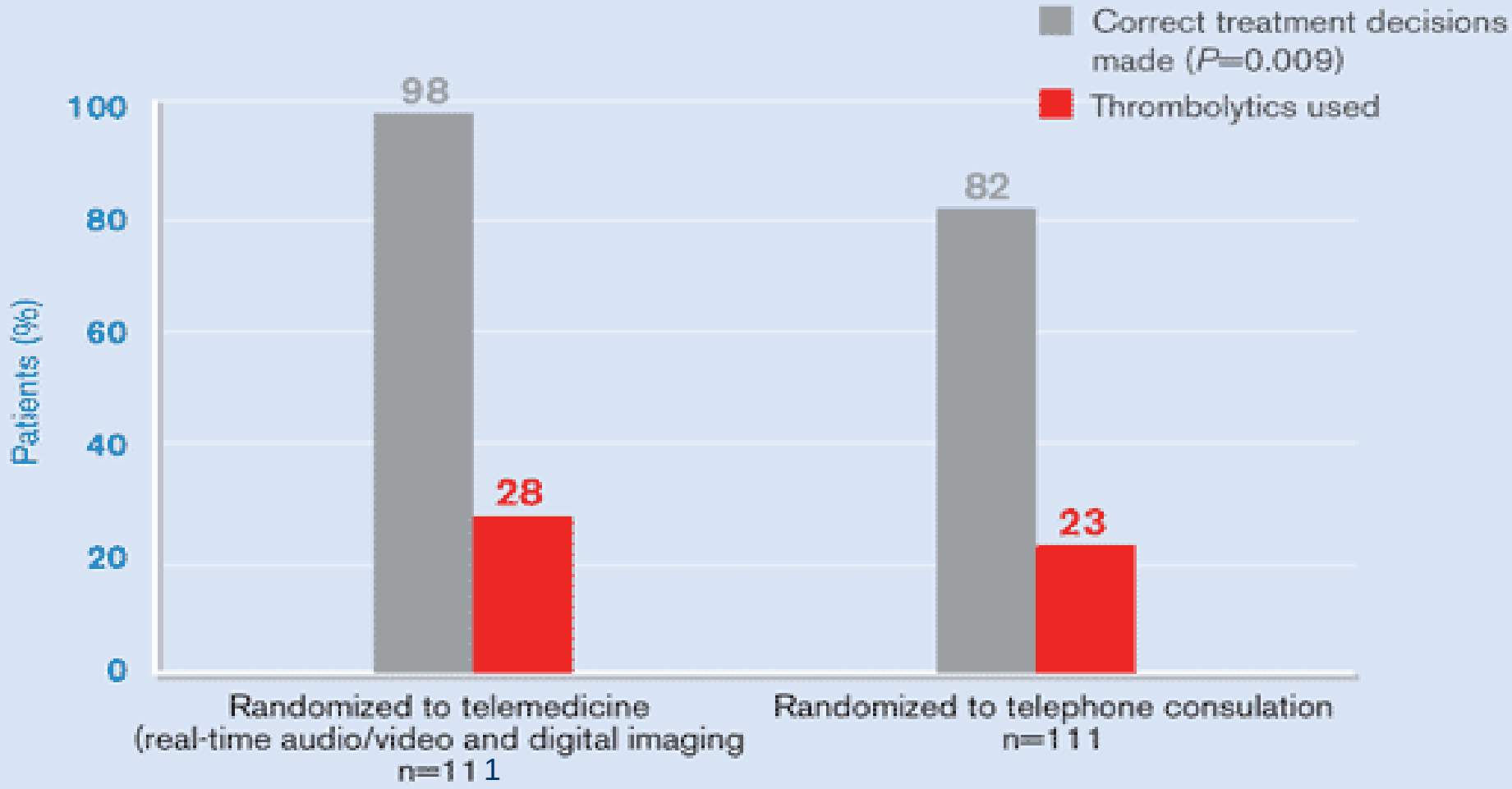
Why Telestroke?



How it works

- Internet-based video and audio link allows real-time assessment of patients and imaging by remote stroke specialists in consultation with ER docs
- Allows 2-way interaction
- Allows remote CT transfer
- Communication with family

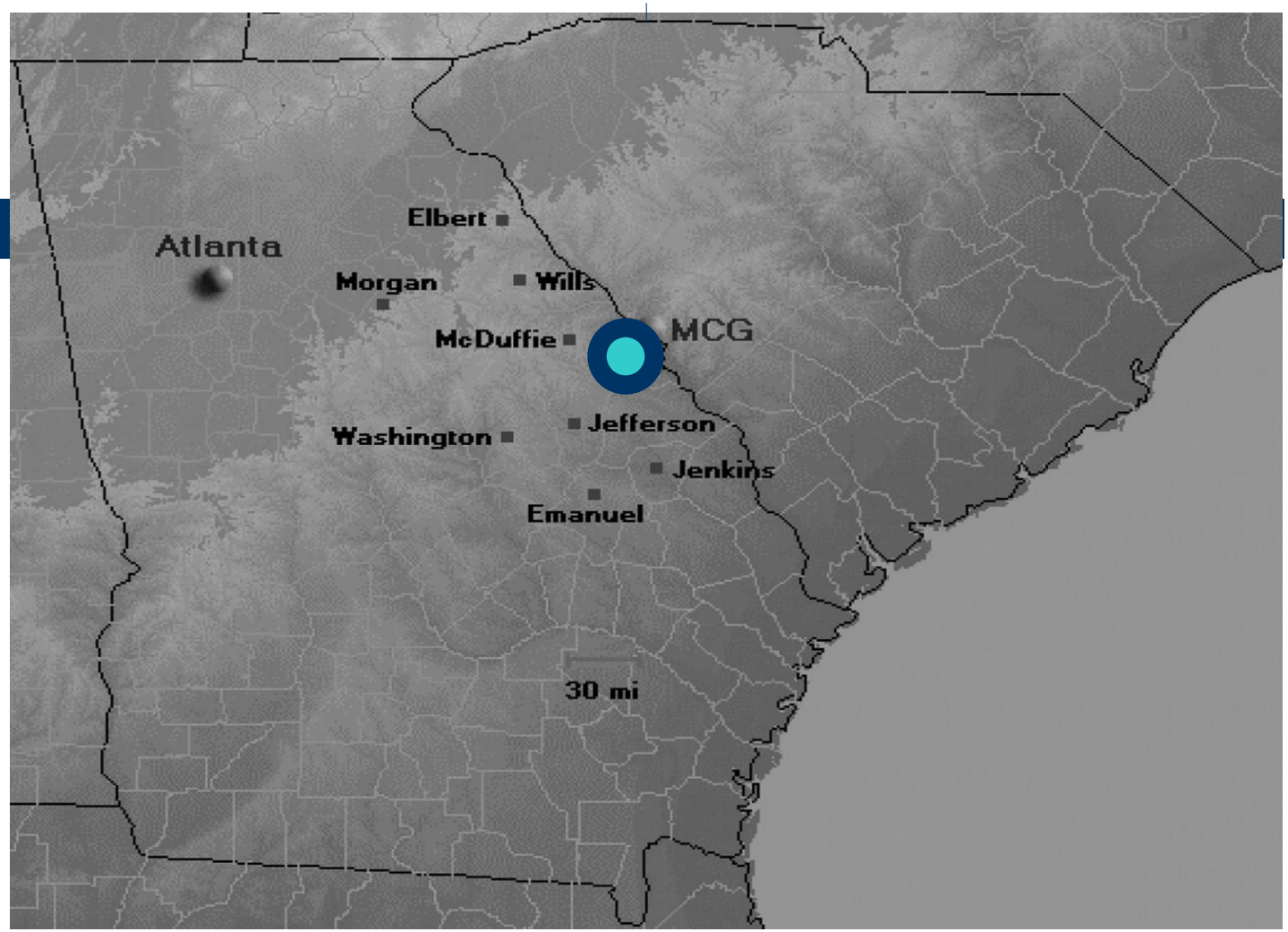
Telemedicine vs telephone consulation in STRokE DOC



Clinical Feasibility of a Rural Telestroke Network

- (*Stroke.* 2005;36:2018.)
- David C. Hess, MD; Samuel Wang, MS; William Hamilton, MBA, MHA; Sung Lee, MD; Carol Pardue, RN, MSN; Jennifer L. Waller, PhD; Hartmut Gross, MD; Fenwick Nichols, MD; Christiana Hall, MD; Robert J. Adams, MD
  From the Departments of Neurology (D.C.H., S.W., W.H., C.P., F.N., C.H., R.J.A.) Biostatistics (J.L.W.), and Emergency Medicine (H.G.), Medical College of Georgia, Augusta; Department of Neurology, Mayo Clinic (S.L.), Rochester, Minn; and Medical College of Georgia Health Incorporated (W.H., C.P.), Augusta.
- ***Background and Purpose—*** Development of stroke networks is critical to bringing guideline-driven stroke care to rural, underserved areas.
- ***Methods—*** A Web-based telestroke tool, REACH, was developed to provide a foundation for a rural stroke network that delivered acute stroke consults 24 hours per day 7 days per week to 8 rural community hospitals in Georgia.
- ***Results—*** There were 194 acute stroke consults delivered. Thirty patients were treated with tissue plasminogen activator (tPA). The mean National Institutes of Health Stroke Score (NIHSS) was 15.4, and the median NIHSS was 12.5. The mean onset to treatment time (OTT) was 122 minutes. The OTT dropped from 143 minutes in the first 10 patients treated to 111 minutes in last 20 patients. Of the 30 patients treated with tPA, 23% (7) were treated in 90 minutes and 60% (18) were treated within 2 hours. There were no symptomatic intracerebral hemorrhages.
- ***Conclusions—*** The REACH telestroke system permits the rapid and safe use of tPA in rural community hospitals. Over time, the system became more efficient and OTT decreased.

REACH sites in eastern Georgia

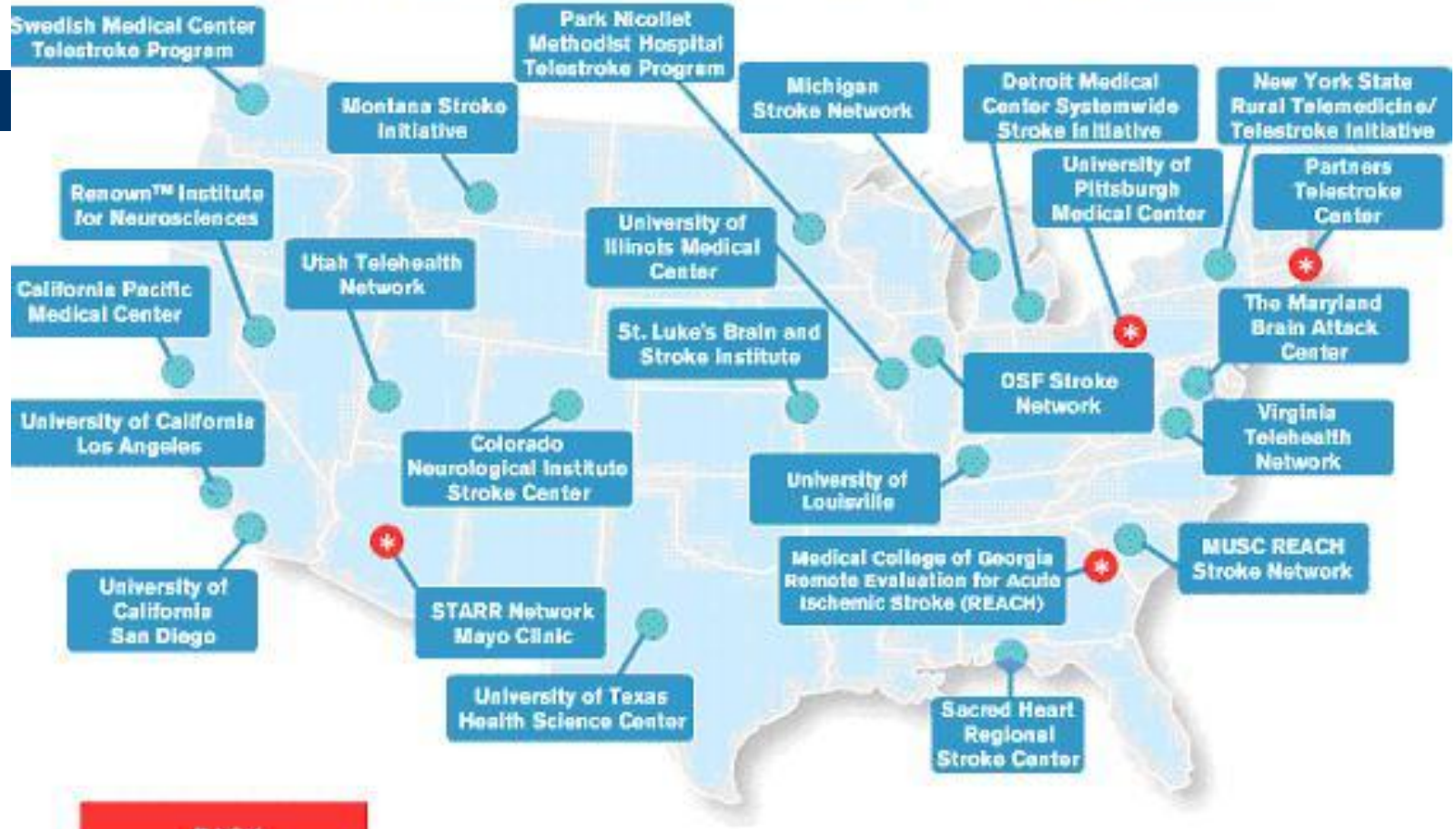


Hess, D. C. et al. Stroke 2005;36:2018-2020

American Heart Association. | American Stroke Association.
Learn and Live.

Telestroke networks throughout the United States

Telestroke networks may be found in more than 20 states across the country. New telestroke networks can further expand the reach of specialized stroke care to rural and underserved areas of the United States.*



BACK

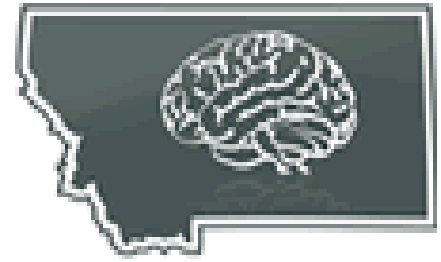
Roll over dots to view telestroke systems. Click on selected pop-up labels to visit center Web sites.

Review case studies with more detailed information about 2 telestroke networks.

MT stroke initiative

- Spoke and hub system
  - State wide vs. regional

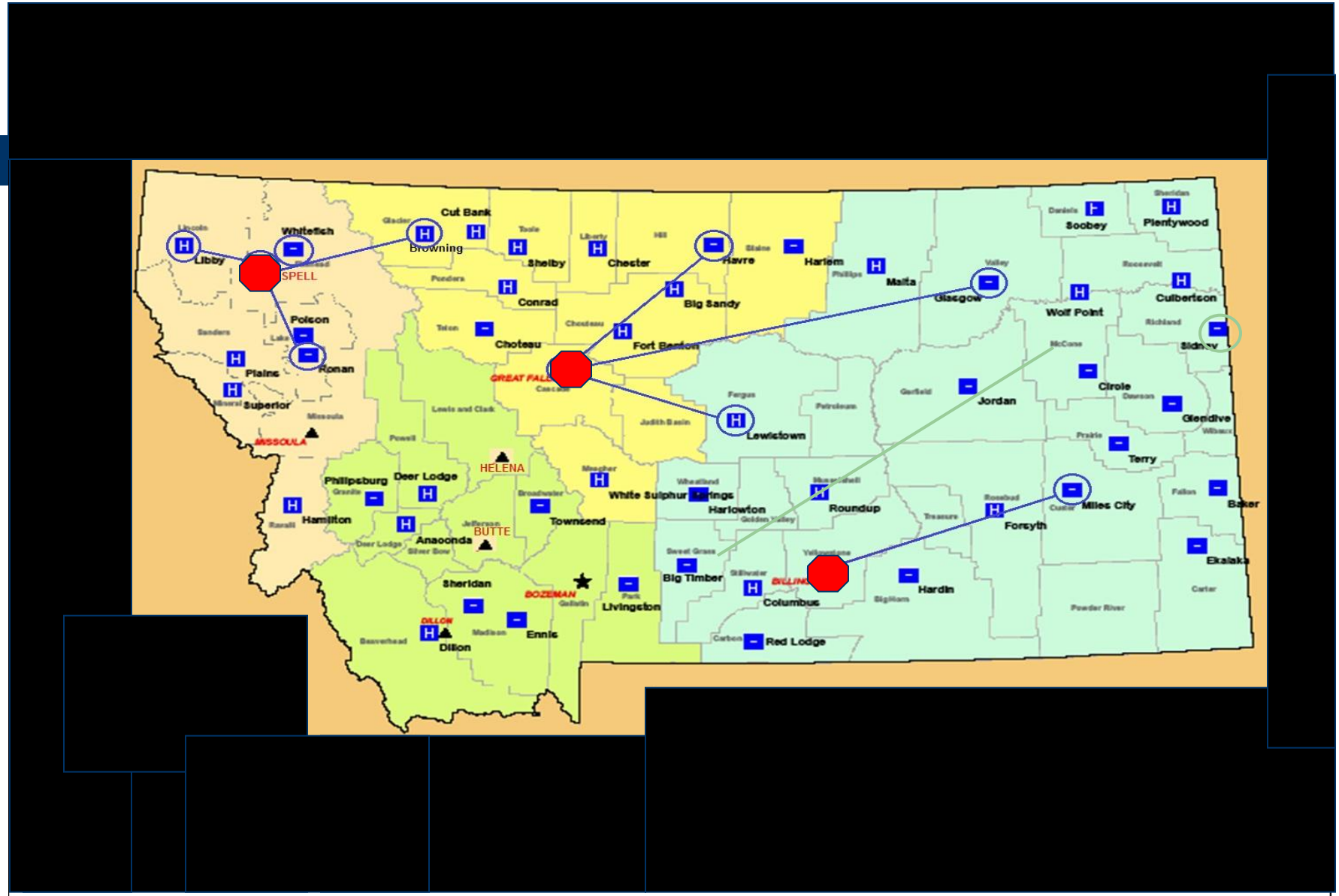
MONTANA
Stroke Initiative



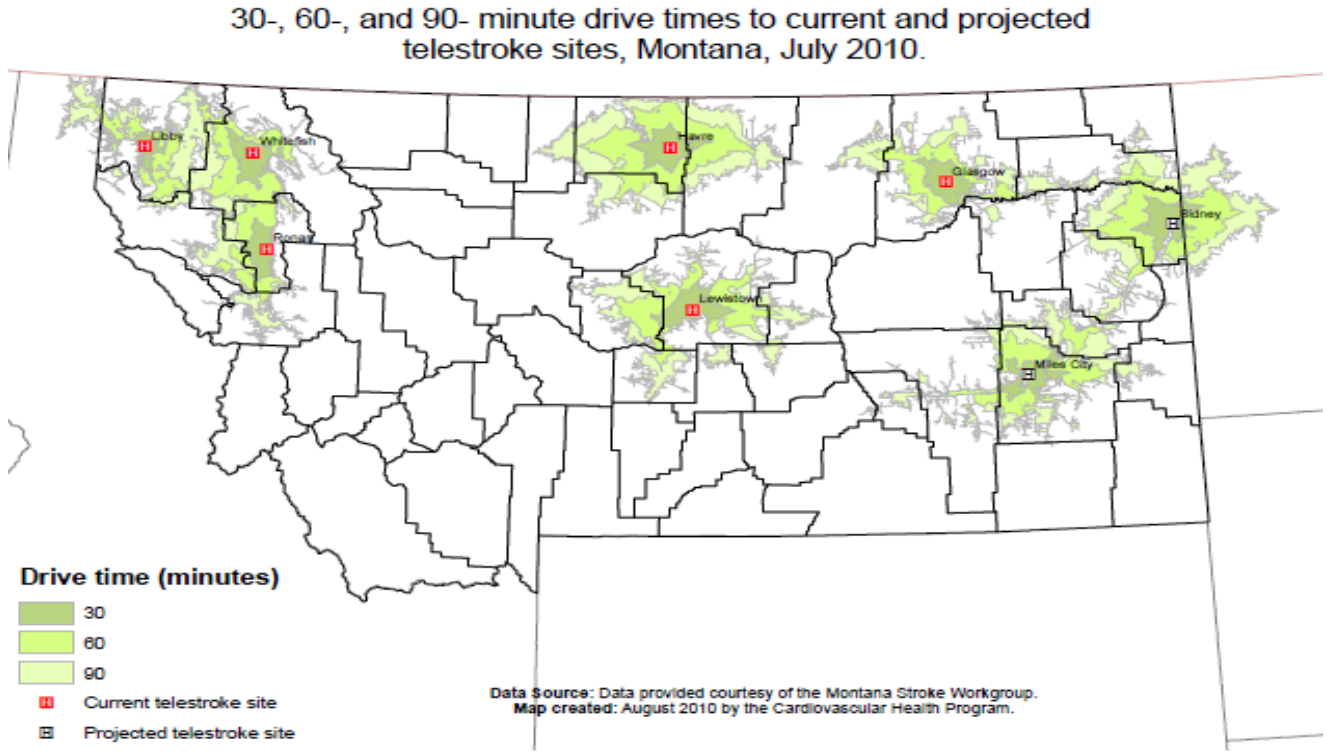
Neurologist Currently Involved

- Statewide (Lewistown, Havre, Glasgow)
  - Nick Okon - Billings
  - Dennis Dietrich – Great Falls
  - Chris Fanale & Robert Pratt – CO
  - Aaron Heide & David Tirschwell – WA
  - Melanie Klawiter – Great Falls – currently in the credentialing process with participating facilities
- Kalispell (Libby, Whitefish, Ronan)
  - Bret Lindsay, Donald Stone, Kurt Lindsay & Pat Burns

Current State-wide System



Drive Times to Telestroke sites



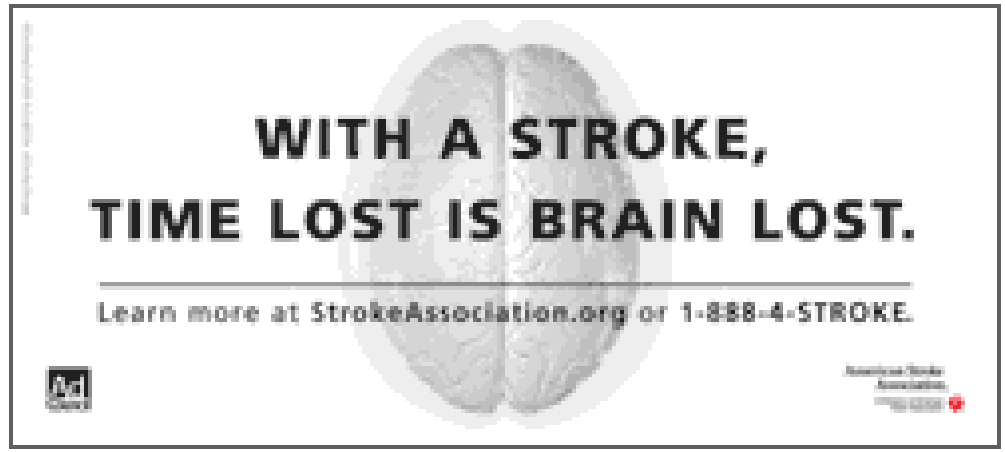
TeleStroke

Our experience thus far from KRMC…

- 7 consultations (3 libby, 3 ronan, 1 wf)
  - 4 with IV tPA used within 3 hours
  - 3/4 with improved outcomes
  - No complications
  - Excellent pt, family and remote MD experience
  - No major technical glitches…yet

Barriers

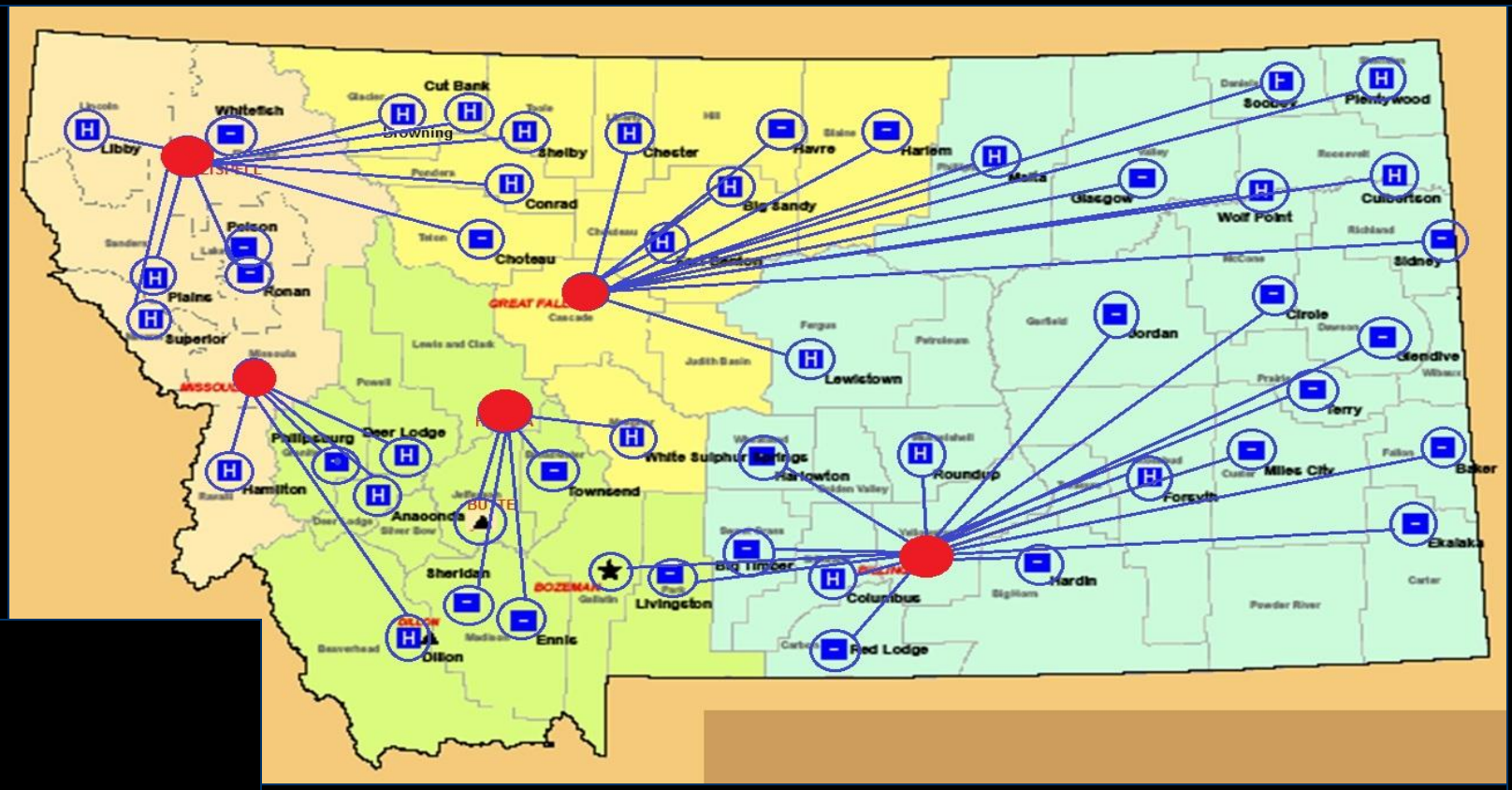
- Finding MD and administration champions
- Engaging Primary Stroke Center Hospital Administrations
- Liability and credentialing
- Funding options



The Future

- Working regionally with primary stroke center hospitals to form more complete state-wide coverage
- Engaging regional neurologists
- Improving general population education concerning stroke

Our Goal……


Cut Bank
Whitefish
Libby
Browning
Shelby
Chester
Havre
Harlem
Conrad
Big Sandy
Malta
Glasgow
Wolf Point
Culbertson
Sidney
Poison
Choteau
Plains
Ronan
Superior
Lewistown
Jordan
Circle
Glendive
Terry
Phillipsburg
Deer Lodge
White Sulphur Springs
Harlowton
Roundup
Miles City
Baker
Hamilton
Anaconda
Townsend
Forsyth
Ekalaka
Sheridan
Big Timber
Hardin
Livingston
Columbus
Ennis
Dillon
Red Lodge